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Teaching CAD/CAM tools through Project- Based Learning at undergraduate level

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Project-Based Learning (PBL) is a powerful educational approach that promotes creative problem-solving skills through structured activities. This paper presents a study investigating the effectiveness of PBL in improving student performance and engagement in computer-aided drafting (CAD) modules within engineering education. Traditional instructional methods often fail to engage students effectively, leading to low attendance rates, limited engagement, and poor academic performance. This study addresses these challenges by implementing PBL and evaluating its impact on motivation and performance. The research focused on 50 civil engineering students who participated in a PBL approach using an educational version of AutoCAD, a computer- aided drafting tool. The PBL module consisted of a comprehensive introduction to the AutoCAD user interface and operating procedures, followed by individual mechanical components divided into sub-stages. The progress of student groups was monitored and evaluated weekly, using a rubric to assess performance and engagement. The results demonstrated significant improvements in student performance and engagement through the implementation of PBL. The PBL group achieved higher average scores (72%) compared to the traditionally instructed group (65%). Moreover, the PBL group exhibited a higher attendance rate (85%) compared to the traditionally instructed group (75%). Evaluation using the rubric consistently indicated that the PBL group demonstrated stronger problem-solving and collaboration skills, indicating higher levels of engagement. These findings highlight the positive impact of PBL on learning outcomes in CAD modules within mechanical engineering education. The hands-on and industry-relevant nature of PBL activities likely contributed to increased motivation and active participation among students.

Keywords: Project Computer Aided Drafting (CAD), Problem Solving, Project-Based Learning (PBL), Student Engagement, Student Performance

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